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EXAMINER	
WONG, KIN C	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/779,875	SINGER ET AL.	
	Examiner	Art Unit	
	K. Wong	2651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 October 2002.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-102 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20,22-65 and 67-102 is/are rejected.

7)☒ Claim(s) 21 and 66 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 09 February 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 12.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed (to disk drive).

Claim Objections

Claims (14,15, 46 and 47) are objected to under 37 CFR 1.75 (a) as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In page 46, lines 12-28 of the specification, where the "symmetric" disclosure is described as other technique that which fails to disclose the implementations of the symmetric techniques and/or the interrelationships between the instant embodiment. Thus, a gap is created in the description of which causes an indefinite in the distinction of the claim subject matter.

Claims (33, 55, 62 and 77-83) are objected to because the phrase "computer-executable process *steps*" in an apparatus claims. The word "step" is a restricted patent phraseology. The examiner suggests "code (or instruction)" for the replacement of the word above so that it would not be construed as a method in an apparatus claim.

Claim 88 is objected because the nomenclature of "*PV*" table is not defined in the claim. An appropriate action is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims (1-20, 22-27, 29-63, 65, 68-75, 84-89, 91-98 and 100-102) are rejected under 35 U.S.C. 102(e) as being anticipated by Singhose et al (5638267).

Regarding claim 1: Singhose et al discloses the procedure of controlling movement in a dynamic system which can be expressed in terms of both rigid and flexible modes (in col. 27, lines 45-55 where Singhose et al describes flexible and rigid modes in the dynamic system), the procedure including the steps of:

generating a rigid body input for the dynamic system (col. 27, line 53 to col. 28, line 23 of Singhose et al);

processing the rigid body input so as to produce a processed input which compensates for vibrations in the flexible mode of the system (col. 28, lines 24-61); and

applying the processed input to control the dynamic system (col. 28, line 62 to col. 29, line 65).

Regarding claim 2: Singhose et al depicts in figure 46 that wherein the generating step includes (i) creating a model of the rigid mode of the dynamic system based on a modal analysis, and (ii) determining the rigid body input based on the modal analysis (see the associated descriptions for details).

Regarding claim 3: Singhose et al teaches that wherein the rigid body input corresponds to a fundamental limiting parameter of the system, the fundamental limiting parameter of the system comprising a first parameter of the system to enter into

saturation (in col. 19, line 56 to col. 20, line 2 where Singhose et al describes the saturation of the system).

Regarding claim 4: Singhose et al discloses that wherein the processing step processes the rigid body input in accordance with a system vibration limiting constraint and a system sensitivity constraint (in col. 20, line 3 to col. 21, line 7 where Singhose et al describes the system sensitivity constrains).

Regarding claim 5: Singhose et al teaches that wherein the system vibration limiting and sensitivity constraints reduce vibration during movement of a component of the dynamic system by less than 100% (in col. 20, lines 18-27 of Singhose et al).

Regarding claim 6: Singhose et al teaches that wherein the processing step processes the rigid body input in accordance with one or more constraints that are a function of a movement distance of a component of the dynamic system (in col. 33, line 14-38 of Singhose et al).

Regarding claim 7: Singhose et al teaches that wherein the processing step processes the rigid body input in accordance with a system vibration limiting constraint only (in col. 11, line 43 to col. 12, line 45 of Singhose et al).

Regarding claim 8: Singhose et al teaches that wherein the processing step shapes the rigid body input using a predetermined shaping function (in col. 13, lines 33-46 of Singhose et al).

Regarding claim 9: Singhose et al teaches that wherein the rigid body input includes both transient portions and a steady state portion; and wherein only the transient portions of the rigid body input are shaped in accordance with the

predetermined shaping function (in col. 45, line 1-28 and col. 57, line 62 to col. 58, line 29 of Singhose et al).

Regarding claim 10: Singhose et al teaches that wherein the processing step processes the rigid body input by filtering the input using filters having zeros which are substantially near poles of the system (in col. 57, lines 42-60 of Singhose et al).

Regarding claim 11: Singhose et al teaches that wherein the processing step processes the rigid body input in accordance with at least one of constraints relating to system thermal limits, system current limits, and system duty cycle (in col. 18, lines 50-58 of Singhose et al).

Regarding claim 12: Singhose et al teaches that wherein the processing step processes the rigid body input by determining a movement distance of a component of the dynamic system and modifying the rigid body input based on the movement distance (in col. 18, lines 35-41 and col. 27, line 44 to col. 28, line 23 of Singhose et al).

Regarding claim 13: Singhose et al teaches that wherein the rigid body input includes a Posicast input (in col. 6, line 64 to col. 7, line 2 and col. 51, line 65 to col. 52, line 13 of Singhose et al).

Regarding claim 14: Singhose et al depicts in figure 31 that wherein the rigid body input comprises a symmetric input (see the associated descriptions for details).

Regarding claim 15: Singhose et al teaches that wherein the processing step processes the rigid body input in accordance with a symmetric constraint that varies as a function of at least one of time and position of a component of the dynamic system (in

col. 33, lines 19-39 where Singhose et al describes the symmetric constrain that with the time and the position).

Regarding claim 16: the limitations of wherein the rigid body input comprising a voltage which has been controlled by controlling current are considered inherent because voltage is an integral component of the current.

Regarding claim 17: Singhose et al teaches that wherein the processing step comprises: identifying system parameters in real-time; and modifying the rigid body input in real-time in accordance with the system parameters identified in the identifying step (in col. 1, lines 50-59 of Singhose).

Regarding claim 18: Singhose et al depicts in figure 7 that wherein the determining step determines the rigid body input in accordance with an insensitivity constraint (see the associated descriptions for details).

Regarding claim 19: Singhose et al teaches that wherein the model of the system comprises a plurality of equations for the system; and wherein an insensitivity constraint for a particular system parameter is added to the system by taking a derivative of a system equation with respect to the insensitivity constraint and setting the derivative equal to zero (in col. 11, lines 6-53 of Singhose et al).

Regarding claim 20: Singhose et al teaches that wherein the model of the system comprises a plurality of equations for the system; and wherein an insensitivity constraint for a particular system parameter is added to the system by setting a series of constraints for different values of the system parameter so as to limit a variation in the system parameter (in col. 11, line 6 to col. 16, line 67 of Singhose et al).

Regarding claim 22: Singhose et al teaches that further comprising determining a center of mass of a component of the dynamic system (col. 27, line 44 to col. 28, line 43 of Singhose et al); wherein the rigid body input is determined in accordance with a feedback signal based on the center of mass of the component (in col. 57, line 19 to col. 58, line 54 where Singhose et al describes feedback loop in the compensation or cancellation of the vibration in the system).

Regarding claims 33-54: apparatus claims (33-54) are drawn to the apparatus corresponding to the method of using same as claimed in claims (1-22), and are rejected for the same reasons of anticipation as used above.

Regarding claim 23: Singhose et al discloses the procedures of determining plural switch times for a voltage (voltage is an inherent integral component of the current) input to a dynamic system having plural modes, the procedure including the steps of:

generating a model of the dynamic system based on a modal analysis of each of the plural modes (in col. 32, line 9 to col. 33, line 39 of Singhose et al);

determining a response of the dynamic system in terms of the modal analysis in the model (as depicted in figure 46 of Singhose et al and see the associated descriptions for details);

determining an expression for a contribution of each of the plural modes to a final location of the system based on a corresponding response (see col. 48, line 65 to col. 51, line 6), the contribution of each mode of the system being based on switch times for the voltage input;

estimating values relating to the plural switch times (see col. 51, lines 11-22 of Singhose et al); and

calculating approximations of the values relating to the plural switch times based on the estimated values using the expression for the contribution of each of the plural modes and the modal analysis in the model of the dynamic system (in col. 51, line 11 to col. 53, line 42 of Singhose et al).

Regarding claim 24: Singhose et al teaches that further including the step of re-calculating approximations of the values based on a previous approximation the values (in col. 51, line 11 to col. 54, line 45 of Singhose et al).

Regarding claim 25: Singhose et al teaches that wherein the re calculating step is repeated a plurality of times, each time using a re-calculated approximation of the values as the previous approximation of the values (in col. 51, line 11 to col. 4, line 45 of Singhose et al).

Regarding claim 26: Singhose et al teaches that further Including the step of generating a table comprising plural switch times; wherein the estimating step comprises estimating the values using the table (in col. 51, lines 11-34 of Singhose et al).

Regarding claim 27: Singhose et al depicts in figures 75a-75c that the step of generating at least one curve corresponding to the plural switch times; wherein the estimating step comprises estimating the values using the at least one curve (see the associated descriptions for details).

Regarding claim 29: the limitations of the step of performing input shaping on the voltage input after switch times therefor have been calculated are considered inherent because the voltage is an inherent integral of the current (see figures 75a-75c of Singhose et al).

Regarding claim 30: Singhose et al teaches that wherein the estimating step is performed using a parameter estimator (in col. 1, line 60 to col. 2, line 15 of Singhose et la).

Regarding claims 55-61: apparatus claims (55-61) are drawn to the apparatus corresponding to the method of using same as claimed in claims (23-30), and are rejected for the same reasons of anticipation as used above.

Regarding claim 31: Singhose et al discloses a procedure of reducing unwanted vibrations in a dynamic system (see col. 1, lines 60-63 and col. 2, lines 33-44 of Singhose et al), the procedure including the steps of:

determining whether greater than a predetermined level of vibrations will be excited by a system input (as depicted in figures 20 and 21 of Singhose et al and see the associated descriptions for details); and

modifying the input to the dynamic system in a case that greater than the predetermined level of vibrations will be excited, where the input to the dynamic system is modified so as to reduce the level of vibrations in the system to less than the predetermined level of vibrations (col. 3, lines 50-67 of Singhose et al).

Regarding claim 32: Singhose et al teaches that wherein the modifying step includes using at least one of an input shaper, an inverse shaper, and a filter in order to modify the input to the dynamic system (in col. 58, lines 5-54 of Singhose et al).

Regarding claims (62-63): apparatus claims (62-63) are drawn to the apparatus corresponding to the method of using same as claimed in claims (31-32), and are rejected for the same reasons of anticipation as used above.

Regarding claim 65: the limitations of wherein the model of the system includes the partial fraction expansion of the third order are consider inherent because Singhose et al describes the partial fraction expansion function in col. 18, lines 18-67 of Singhose et al).

Regarding claim 68: Singhose et al discloses the procedure of using a current command to control a system having voltage (voltage is an inherent integral component of an electrical input source (power supply or driver) and/or drive current) as a physical limiting parameter (see col. 18, lines 50-57 of Singhose et al), where the system includes a current controller connected to a power supply, the procedure including the steps of:

inputting a current command to the system (in col. 31, line 50 to col. 33, line 11 and col. 31 , lines 50-63 where Singhose et al describes the controller controls the current command control in the system);

shaping the current command using a unity magnitude shaper (see col. 33, lines 14-17 of Singhose et al) so that the current controller in the system goes into saturation (see col. 19, line 56 to col. 20, line 2 of Singhose et al); and

supplying voltage to the system from the power supply via the current controller in saturation (see col. 18, line 11 to col. 20, line 2 of Singhose et al).

Regarding claim 69: Singhose et al discloses the procedure of controlling a dynamic system having one or more feedforward inputs (see col. 57, lines 19-31 of Singhose et al), where one of the feedforward inputs corresponds to a fundamental limiting parameter of the system, the procedure including the steps of:

altering a form of a feedforward input that corresponds to the fundamental limiting parameter of the system so as to reduce unwanted dynamics of the system (see col. 57, line 19 to col. 58, line 54 of Singhose et al).

Regarding claim 70: Singhose et al teaches that further including the step of determining the fundamental limiting parameter of the system by identifying a first parameter of the system to enter into saturation (in col. 19, line 56 to col. 20, line 2 of Singhose et al).

Regarding claim 71: Singhose et al teaches that wherein the altering step includes shaping the feedforward input (in col. 57, lines 19-31 of Singhose et al).

Regarding claim 72: Singhose et al that wherein the shaping is performed using Input Shaping.TM. (col. 57, lines 19-22 of Singhose et al).

Regarding claim 73: Singhose et al teaches that wherein the shaping is performed using one or more filters (in col. 24, lines 15-64 and col. 58, lines 26-54 of Singhose et al).

Regarding claim 74: Singhose et al teaches that further including the steps of: identifying any nonlinear elements in the system; wherein the shaping is performed after

any nonlinear elements identified in the identifying step (in col. 58, lines 19-29 of Singhose et al).

Regarding claim 75: Singhose et al teaches that wherein the altering step includes pre-saturating the feedforward input and then shaping the feedforward input (in col. 53, line 44 to col. 54, line 12 and col. 58, lines 5-13 of Singhose et al).

Regarding claim 84: Singhose et al discloses a procedure of shaping an input to a dynamic system so as to reduce unwanted dynamics in the system, the input to the dynamic system comprising digital data sampled at a predetermined frequency, the procedure comprising the steps of:

identifying system vibrations that occur at the Nyquist frequency for the system (see col. 57, lines 34-40 of Singhose et al), the system vibrations corresponding to a sine wave having two sample points per period (The Nyquist interpretation of the analog or sine wave is the twice of the analog signal, thus, the two sample points are inherent functions of the Nyquist.); and

applying a three-pulse shaper to the input, wherein first and second pulses of the three-pulse shaper are applied at the two sample points in a first period of the input, and a third pulse of the three-pulse shaper is applied at a first sample point in a second period of the input (as depicted in figure 79 and see the associated descriptions for details).

Regarding claim 85: Singhose et al discloses a procedure of generating an input to a computer-controlled dynamic system so as to suppress vibrations therein, the dynamic system having a dedicated path solely for a feedforward input from a controller

to controlled hardware (see col. 57, lines 19-45 of Singhose et al), the procedure including the steps of:

determining a frequency of vibrations to be suppressed (col. 57, lines 34-41 of Singhose et al);

wherein, in a case that the frequency of the vibrations to be suppressed is at or below a servo rate for the dynamic system (col. 57, lines 34-41), the procedure includes the steps of:

executing servo calculations for the system (see col. 46, line 55 to col. 47, line 67 of Singhose et al);

determining a servo output based on the servo calculations (col. 47, lines 6-18 of Singhose et al); and

outputting the servo output as the input to the dynamic system (as depicted in figure 77 and see the associated descriptions for details); and

wherein, in a case that the frequency is above the servo rate for the dynamic system, the procedure includes the steps of:

determining a trajectory value; shaping the trajectory; and outputting the shaped trajectory as the input to the dynamic system (see col. 41, line 4 to col. 44, line 59 and col. 57, lines 19-67 of Singhose et al).

Regarding claim 86: Singhose et al procedure of generating an input to a computer-controlled dynamic system so as to suppress vibrations therein, the dynamic system having a path by which a feedforward input and other signals are output from a controller to controlled hardware, the procedure including the steps of:

executing servo calculations for the system (see col. 46, line 55 to col. 47, line 67 of Singhose et al);

determining a servo output based on the servo calculations (col. 47, lines 6-18 of Singhose et al);

storing the servo output in a memory (col. 46, line 56 to col. 47, line 6 of Singhose et al);

determining a trajectory value for the feedforward input (col. 41, line 4 to col. 44, line 59 and col. 57, lines 19-67 of Singhose et al);

shaping the trajectory value (see col. 47, lines 31-45 of Singhose et al); and

adding the servo output stored in the memory to the shaped trajectory value so as to generate the feedforward input (col. 46, line 56 to col. 47, line 18 of Singhose et al).

Regarding claim 87: Singhose et al disclose a procedure of controlling a dynamic system using an input command (col. 31, lines 1-15 of Singhose et al), including the steps of:

shaping the input command to saturation (col. 19, line 56 to col. 20, line 2 of Singhose et al);

inputting the saturated command until a first predetermined condition is detected (see col. 18, lines 18-49 of Singhose et al);

shaping a transition of the input command during deceleration from saturation until a second predetermined condition occurs (as depicted in figures 72 and 75 ,and, see the associated descriptions for details); and

following a preset trajectory until the dynamic system comes to within a predetermined proximity of its final state (in col. 18, lines 12-17 of Singhose et al).

Regarding claim 88: Singhose et al teaches that wherein the preset trajectory comprises a curve in a PV (profile) table (in col. 35, lines 43-54 of Singhose et al).

Regarding claim 89: Singhose et al procedure of generating commands for a dynamic system in a first parameter which maintain a limit in a second parameter, where the second parameter comprises a fundamental limiting parameter of the dynamic system, the procedure including the steps of:

determining a response of the second parameter in the dynamic system to a unit command in the first parameter; and

generating the command in the second parameter based on the response determined in the determining step (as depicted figures 75a-75c and in col. 55, line 2 to col. 57, line 16 where Singhose et al describes the selection of the parameters as of note parameters in above; thus, the limitations of claim are considering satisfied).

Regarding claim 91: Singhose et al teaches that wherein the response is determined by iteratively solving a set of equations for the first parameter knowing at least the second parameter (in col. 55, line 54 to col. 56, line 21 of Singhose et al).

Regarding claim 92: Singhose et al teaches that wherein the set of equations as set forth in recitations of the claim (in col. 32, line 53 to col. 33, line 39 of Singhose et al).

Regarding claims 93: the limitations of wherein A includes current, V includes voltage, and R comprises a voltage response of the system are considered component elements in an electrical system.

Regarding claim 94: Singhose et al teaches that wherein the values of R(i) are determined by taking a peak value of the system response and sampling values of the system response at subsequent time increments (in col. 18, lines 11-58 and col. 32, line 48 to col. 33, line 39 of Singhose et al).

Regarding claim 95: claim 95 is the combination of the scope of claims 92 and 93, therefore, it is consider satisfied for the same reasons as claims 92 and 93 in above.

Regarding claims 96: the limitations of wherein A includes current and V includes voltage are considered component elements in an electrical system.

Regarding claim 97: Singhose et al discloses a procedure of controlling a dynamic system having vibrations resulting from movement, the procedure comprising the steps of: identifying transitions of an input command to the dynamic system; and shaping transitions of the input command so as to result in a system response to the input command with reduced vibrations (in col. 3, lines 8-19 and col. 4, lines 1-12 of Singhose et al).

Regarding claim 98: Singhose et al discloses a procedure of controlling a system to reduce unwanted dynamics using commands in both first and second parameters (constrains), where the second parameter comprises a fundamental limiting parameter of the system, the procedure including: commanding the system in the first parameter during a first mode of system operation; and commanding the system in the second

parameter during a second mode of system operation (in col. 2, lines 45-61 and col. 4, lines 1-12 of Singhose et al).

Regarding claim 100: Singhose et al teaches that wherein V.sub.lim is varied in accordance with i (in col. 32, lines 54-58 of Singhose et al).

Regarding claim 101: Singhose et al that wherein constraints are added for parameter slew rate limits; and wherein the generating step generates the command in accordance with the added constraints (in col. 36, line 24 to col. 36, line 51 where Singhose et al describes the using the slew rates for generating use command signals).

Regarding claim 102: Singhose et al a procedure of rescaling a vibration-limiting input to a dynamic system, the procedure including the step of: linearly scaling (see col. 40, lines 6-11 of Singhose et al) amplitudes of the vibration-limiting input to produce a scaled vibration-limiting input.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims (28, 64, 67, 76-83, 90 and 99) are rejected under 35 U.S.C. 103(a) as being unpatentable over Singhose et al (5638267) in view of Wang et al (6148240).

Regarding claims 28 and 64: although Singhose et al disclose the bang-bang apparatus, Singhose et al fails to positively addressed the bang-bang apparatus as the disk drive (or data storage) and the bang-bang seek. Wang et al is relied on for the

teachings of the bang-bang apparatus as the disk drive with the bang-bang seek (an inherent function of the disk drive) (see col. 3, lines 39-65 of Wang et al).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the bang-bang apparatus of Singhose et al with the bang-bang disk drive as taught by Wang et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to provide an overall seeking acoustic reduction in the bang-bang disk drive as suggested in col. 5, lines 65-66 of Wang et al.

Regarding claim 66: the limitations of the partial fraction expansion of the final position (or placement or location of the head on the disk) equation (as set forth in the claim) are considered known because the mathematical model equation is disclosed in Tuttle et al (in col. 88, line 29 to col. 90, line 50 of Tuttle et al). Thus, the limitations of claim 66 are satisfied.

Regarding claim 67: Singhose et al teaches wherein the input determined in the determining step comprises the fundamental limiting parameter of the system, the fundamental limiting parameter corresponding to a first parameter in the system to enter into saturation (in col. 19, line 56 to col. 20, line 2 of Singhose et al).

Regarding claims 76, 90 and 99. the reason for Singhose et al is noted in above rejections. Singhose is silent on data storage device system (disk drive). Wang et al further relied on the teachings of the disk drive (see col. 3, lines 39-65 and figure 1 of Wang et al).

It would be further obvious to one of ordinary skill in the art at the time of the invention was made to modify the apparatus of Singhose et al to be adaptive to the disk

drive as taught by Wang et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to provide an overall seeking acoustic reduction in the bang-bang disk drive as suggested in col. 5, lines 65-66 of Wang et al.

Regarding claim 90: the limitations of wherein the first parameter is current and the second parameter is voltage; and wherein the dynamic system comprises a disk drive are considered known parameter for an electrical apparatus (disk drive).

Regarding claim 99: the limitations of wherein the system includes a disk drive; wherein the first mode of operation includes tracking (see col. 41, line 1 to col. 42, line 31 of Singhose et al) performed by the disk drive; and wherein the second mode of operation includes seeking (trajectory – see col. 46, line 55 to col. 47, line 67 of Singhose et al) performed by the disk drive are considered known in the disk drive of Singhose et al and Wang et al. Furthermore, the tracking (following) and the seek (trajectory) modes are well known by the artisan in the art.

Regarding claims 77-83: apparatus claims (77-83) are drawn to the apparatus corresponding to the method of using same as claimed in claims (69-76), and are rejected for the same reasons of obviousness as used above.

Allowable Subject Matter

Claims (21 and 66) are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

regarding claim 21: the prior art of record neither discloses nor suggests the quasi-static correction factor with the feedback loop in a disk drive;

regarding claim 66: the prior art of record neither discloses nor suggests the mathematical equation as set forth in claim 66 for a disk drive.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tuttle et al (6505085) reads on claims (1-30 and 33-61) but it is not used on this office action because of among other things. Schmidt et al (6256163) is cited for input shaping in the disk drive. Microsoft Press Computer Dictionary is cited for defining the "real-time" in a real-time operating apparatus. Matsuo et al (6615110), McConnell et al (6002232), McConnell et al (6011373), Pirzadeh (6624964), Tuttle et al (6694196) and Wang et al (6697767) are cited for dynamic system control.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Wong whose telephone number is (703) 305-7772.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Hudspeth can be reached on (703) 308-4825. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

kw

24 Jun 04

DAVID HUDSPETH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 26